

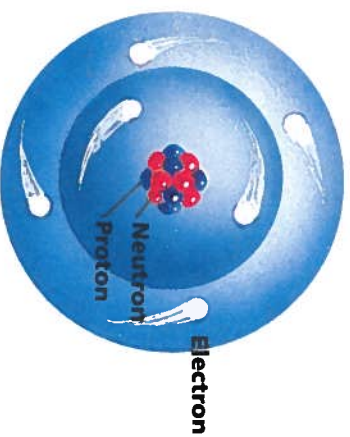
10-1 What is electricity?

Objective ▶ Distinguish between positive and negative electric charges.

TechTerms

- ▶ **electricity** (i-lek-TRIS-uh-tee): form of energy caused by moving electrons
- ▶ **electron**: atomic particle with a negative electric charge
- ▶ **neutron**: atomic particle with neither a negative nor a positive electric charge
- ▶ **proton**: atomic particle with a positive electric charge

Atoms One of the smallest particles in nature is called an atom. Matter is made up of atoms. Atoms have three basic parts. They are **neutrons**, **electrons**, and **protons**. The neutrons and protons are found in the center of the atom. The electrons circle around the protons and neutrons in a cloud.

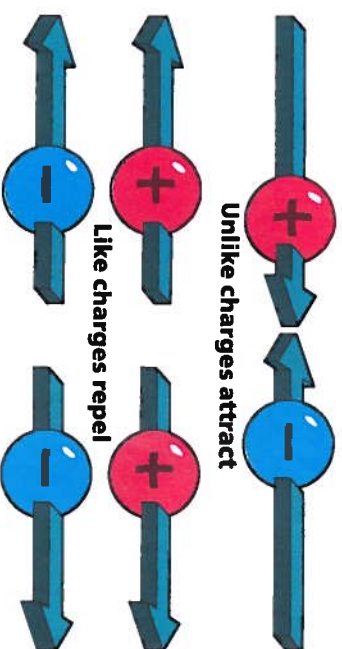


Name: What are the three main parts of an atom?

Electric Charge Protons and electrons have an electric charge. The electron has a minus sign (−). A negative charge is shown with a minus sign (−). The proton has a positive charge. A positive charge is shown with a plus sign (+). Objects that have an electric charge follow these rules:

- ▶ Objects with the same charge repel, or move away from, each other.

- ▶ Objects with different charges attract each other.



Because they have opposite charges, electrons and protons attract each other. Two electrons, or two protons, repel each other because they have the same charge. An object that has neither a positive nor a negative charge is neutral. Neutrons are neutral.

State: What kind of charge do electrons have?

Neutral Objects Most objects, such as a book or a pencil, are electrically neutral. When you pick up a book, you do not feel an electric charge. However, neutral objects can become electrically charged. When a neutral object gains or loses electrons, it becomes electrically charged. When you walk across a carpet, your body picks up electrons from the carpet. If you then touch a metal doorknob, electrons jump from your hand to the doorknob. You feel an electric charge.

Describe: What happens to a neutral object when it gains electrons?

Electricity Electrons can move from place to place. Electrons always move from a negatively charged area to a positively charged area. The form of energy caused by moving electrons is called **electricity** (i-lek-TRIS-uh-tee).

Define: What is electricity?

LESSON SUMMARY

- ▶ Atoms have three basic parts: neutrons, protons, and electrons.
- ▶ Protons have a positive charge, and electrons have a negative charge.
- ▶ Like charges repel; unlike charges attract.
- ▶ Most objects are electrically neutral.
- ▶ Electrons always move from a negatively charged area to a positively charged area.

CHECK Write true if the statement is true. If the statement is false, change the underlined term to make the statement true.

1. In an atom, the protons circle around the center of the atom.
2. An electron has a negative charge.
3. A neutral object has neither a positive nor a negative charge.
4. Electricity is the energy caused by stationary electrons.
5. Two electrons will repel each other.

APPLY Complete the following.

6. **Infer:** A bolt of lightning results when electrons jump from a cloud to the ground. What does this tell you about the cloud?
7. An atom of oxygen has eight protons and eight electrons. Because there are the same number of protons and electrons, the atom is neutral. What happens if the oxygen atom loses an electron?
8. **Hypothesize:** When you turn on a lamp switch, a flow of electrons causes the lamp to light. Why does the light go on so quickly?

Health and Safety Tip

You should not try to repair or rewire electric appliances yourself. They use a large amount of electricity and can be quite dangerous. Only a trained electrician knows how to handle the wires. Frayed or worn electric wires can cause a bad electric shock. Use library references to find out what to do if someone receives an electric shock.

ACTIVITY

OBSERVING ELECTRIC CHARGES

You will need a plastic or rubber comb and a sheet of paper. Note: this experiment will work best on a cool, dry day.

1. Tear the sheet of paper into small pieces. Spread the pieces of paper on your desk or a table.
2. Run the comb through your hair several times.
3. Hold the comb above the pieces of paper. Be sure not to touch the paper with the comb. Observe what happens to the pieces of paper.

Questions

1. **Observe:** What happened to the pieces of paper when you held the comb over them?
2. How can you explain what happened?

